L27 ANSWER 6 OF 20 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2001:6994494 INSPEC <<LOGINID::20060404>>
DOCUMENT NUMBER: A2001-17-6865-022
TITLE: Structural measurements of amorphous silicon multilayers by the atomic force microscopy
AUTHOR: Chuchmai, I.A.; Khokhlov, A.F.; Ershov, A.V. (Lobachevskii (N.I.) State Univ., Gorki, Russia)
SOURCE: Physics of Low-Dimensional Structures (2001), no.3-4, p. 47-52, 5 refs.
CODEN: PLDSFC, ISSN: 0204-3467
SICI: 0204-3467(2001)3/4L.47:SMAS;1-J
Published by: VSV Co. Ltd, Russia
Conference: Scanning Probe Microscopy-2001 Workshop, Nizhny Novgorod, Russia, 26 Feb.-1 March 2001
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: Russian Federation
LANGUAGE: English
ABSTRACT: Atomic force microscopy is applied for investigation of amorphous **silicon** and zirconium oxide **insulator** (a-Si/ZrOx) or amorphous germanium (a-**Si**/a-**Ge**) multilayer nanostructures (MNS) prepared by electron beam evaporation. Periodicity of a-Si/ZrOx MNS has been confirmed by Auger-spectroscopy. The etching wedge profile of a-Si/ZrOx MNS shows a series of terraces and steps whose number corresponds to the number of periods of the MNS. The MNS period determined by this method agree with that obtained by small angle X-ray diffraction. At the cross-section of a-**Si**/a-**Ge** MNS the a-**Si** and a-**Ge** single-layers are resolved
CLASSIFICATION CODE: A6865 Low-dimensional structures: growth, structure and nonelectronic properties; A6146 Structure of solid clusters, nanoparticles, and nanostructured materials; A6116P Scanning probe microscopy determinations of structures; A8160C Surface treatment and degradation in semiconductor technology
CONTROLLED TERM: amorphous semiconductors; atomic force microscopy; Auger electron spectra; elemental semiconductors; etching; germanium; nanostructured materials; semiconductor **superlattices**; silicon; zirconium compounds
SUPPLEMENTARY TERM: amorphous silicon multilayers; atomic force microscopy; structural measurements; zirconium oxide insulator; a-Si/ZrOx; amorphous germanium; a-Si/a-Ge; multilayer nanostructures; electron beam evaporation; periodicity; Auger-spectroscopy; etching wedge profile; small angle X-ray diffraction; Si; ZrO; Ge
CHEMICAL INDEXING: Si int, Si el; ZrO int, Zr int, O int, ZrO bin, Zr bin, O bin; Ge int, Ge el
ELEMENT TERMS: Si; O*Zr; ZrOx; Zr cp; cp; O cp; O; Zr; ZrO; Ge

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ACCESSION NUMBER: 2000:6712390 INSPEC <<LOGINID::20060404>>
DOCUMENT NUMBER: A2000-21-7360J-002; B2000-11-2530C-011

TITLE: Thermoelectric applications of low-dimensional structures with acoustically mismatched boundaries

AUTHOR: Balandin, A. (Electr. Eng. Dept., California Univ., Riverside, CA, USA)

SOURCE: Physics of Low-Dimensional Structures (2000), no.5-6, p. 73-90, 24 refs.
CODEN: PLDSFC, ISSN: 0204-3467
SICI: 0204-3467(2000)5/6L.73:TADS;1-J
Published by: VSV Co. Ltd, Russia
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
COUNTRY: Russian Federation
LANGUAGE: English

ABSTRACT: It is shown that a finite acoustic mismatch between structure and barrier materials in low-dimensional structures leads to the acoustic phonon confinement, which in its turn brings about a corresponding decrease of the phonon group velocity and modification of the phonon density of states. These factors contribute to the reduction of the in-plane lattice thermal conductivity, thus allowing one to increase the thermoelectric figure of merit. Results of experimental study of confined acoustic phonons in single Si thin films and **Si/Ge superlattices** are also reported. High resolution Raman spectroscopy of ultra-thin **silicon**-on-**insulator** structures reveals multiple peaks in the spectral range from 50 cm-1 to 160 cm-1. The peak positions are consistent with the theoretical predictions and indicate the confined nature of phonon transport in thin films and **superlattices** with a finite acoustic mismatch between layers. This opens up a novel tuning capability for optimization of the thermoelectric properties of low-dimensional structures

CLASSIFICATION CODE: A7360J Electrical properties of elemental semiconductors (thin films/low-dimensional structures); A7220P Thermoelectric effects (semiconductors/insulators); A7280C Electrical conductivity of elemental semiconductors; A7830G Infrared and Raman spectra in inorganic crystals; A7865H Optical properties of elemental semiconductors (thin films/low-dimensional structures); A6322 Phonons in low-dimensional structures and small particles; A6670 Nonelectronic thermal conduction and heat-pulse propagation in nonmetallic solids; B2530C Semiconductor superlattices, quantum wells and related structures; B2520C Elemental semiconductors

CONTROLLED TERM: interface phonons; Raman spectra; semiconductor **superlattices**; semiconductor thin films; thermal conductivity; thermoelectricity

SUPPLEMENTARY TERM: thermoelectric applications; low-dimensional structures; acoustically mismatched boundaries; finite acoustic mismatch; barrier materials; acoustic phonon confinement; phonon group velocity; phonon density of

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ACCESSION NUMBER: 1985:2533642 INSPEC <<LOGINID::20060404>>
DOCUMENT NUMBER: B1985-054476

TITLE: What can molecular beam epitaxy do for silicon devices?

AUTHOR: Allen, F.G. (Dept. of Electr. Eng., California Univ., Los Angeles, CA, USA)

SOURCE: Thin Solid Films (25 Jan. 1985), vol.123, no.4, p. 273-9, 6 refs.
CODEN: THSFAP, ISSN: 0040-6090
Price: 0040-6090/85/$3.30
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English

ABSTRACT: Molecular beam epitaxy offers three important advantages to the silicon device industry. The first is the capability of growing new structures which cannot otherwise be fabricated. Examples of these are planar barrier diodes with barrier widths of tens of angstroms, solar cells with built-in front and back surface fields, cascade solar cells and n-i-p-i layered structures with layer widths down to tens of angstroms. The second advantage is improved dopant control and profile resolution in a single growth process to replace the multiple processes needed for complex devices. Examples are millimeter wave diodes, four-layer semiconductor-controlled rectifiers, buried layer metal/oxide/semiconductor field effect transistors and charge-coupled devices, and precise profile varactors. The third advantage is new materials combinations possible with a low growth temperature and a high purity ultrahigh vacuum environment. Examples are metal silicides, **silicon** on **insulators**, **Si-Ge** alloy **superlattices** and silicon heterojunction with III-V alloys such as AlP and GaP. Molecular beam epitaxial systems in use, the new technique of evaporative doping with solid phase epitaxial regrowth and the resulting crystal quality will be discussed

CLASSIFICATION CODE: B0510D Epitaxial growth; B2520C Elemental semiconductors; B2550 Semiconductor device technology; B2560 Semiconductor devices

CONTROLLED TERM: elemental semiconductors; molecular beam epitaxial growth; semiconductor devices; semiconductor doping; semiconductor growth; silicon

SUPPLEMENTARY TERM: Si devices; semiconductor; MBE; molecular beam epitaxy; dopant control; profile resolution; single growth process; low growth temperature; high purity ultrahigh vacuum environment; evaporative doping; solid phase epitaxial regrowth

ELEMENT TERMS: Ge*Si; Ge sy 2; sy 2; Si sy 2; Si-Ge; V; Al*P; AlP; Al cp; cp; P cp; Ga*P; GaP; Ga cp

states; lattice thermal conductivity; thermoelectric figure of merit; thin films; superlattices; high resolution Raman spectroscopy; 50 to 160 cm-1; Si; Si-Ge

CHEMICAL INDEXING: Si el; **Si-Ge int, Ge int, Si int, Ge el, Si el**

PHYSICAL PROPERTIES: wavelength 6.2E-05 to 2.0E-04 m

ELEMENT TERMS: Ge; Si

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ACCESSION NUMBER: 1995:5123202 INSPEC <<LOGINID::20060404>>

DOCUMENT NUMBER: B1996-01-2560R-015

TITLE: **SiGe** band engineering for MOS, CMOS and quantum effect devices

AUTHOR: Wang, K.L.; Thomas, S.G.; Tanner, M.O. (Dept. of Electr. Eng., California Univ., Los Angeles, CA, USA)

SOURCE: Journal of Materials Science: Materials in Electronics (Oct. 1995), vol.6, no.5, p. 311-24, 83 refs.
CODEN: JSMEEV, ISSN: 0957-4522

DOCUMENT TYPE: Journal

TREATMENT CODE: General Review; Practical

COUNTRY: United Kingdom

LANGUAGE: English

ABSTRACT: In this paper, we review recent progress in **SiGe** MOS technology. Progress in high mobility p-channel and n-channel devices will be presented as well as some of the materials and processing issues related to the fabrication of these heterostructures. In addition, we will present an outlook on the integration of these devices to complimentary MOS (CMOS) based on **Si** on **Insulator** technology (**SOI**). New directions of novel devices utilizing selective epitaxial growth and the integration of **Si/Ge** **superlattices** for enhanced performance in field effect transistors are described. Finally, we will examine some of the materials challenges of integrating **SiGe** technologies with current CMOS production processes

CLASSIFICATION CODE: B2560R Insulated gate field effect transistors; B2570D CMOS integrated circuits; B2530C Semiconductor superlattices, quantum wells and related structures; B2560X Quantum interference devices; B0510D Epitaxial growth; B2520C Elemental semiconductors; B2520M Other semiconductor materials

CONTROLLED TERM: CMOS integrated circuits; elemental semiconductors; Ge-Si alloys; interface states; molecular beam epitaxial growth; MOSFET; quantum interference devices; reviews; semiconductor growth; semiconductor materials; semiconductor **superlattices**; silicon; **silicon**-on-**insulator**; vapour phase epitaxial growth

SUPPLEMENTARY TERM: SiGe band engineering; MOS; CMOS; quantum effect devices; review; SiGe MOS technology; high mobility p-channel devices; high mobility n-channel devices; heterostructures; complimentary MOS technology; Si on insulator technology; SOI; selective epitaxial growth; Si/Ge superlattices; field effect transistors; CMOS production processes; SiGe; Si-SiO2; Si-Ge

CHEMICAL INDEXING: **SiGe int, Ge int, Si int, SiGe bin, Ge bin, Si bin**; Si-SiO2 int, SiO2 int, O2 int, Si int, O int, SiO2 bin, O2 bin, Si bin, O bin, Si el; **Si-Ge int, Ge int, Si int, Ge el, Si el**

ELEMENT TERMS: Si; Ge; O*Si; SiO2; Si cp; cp; O cp; Ge*Si; Ge sy 2; sy 2; Si sy 2; SiGe; Ge cp; SiO; O

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ACCESSION NUMBER: 1992:692162 SCISEARCH <<LOGINID::20060404>>
THE GENUINE ARTICLE: JZ039
TITLE: BAND-GAP OF STRAIN-SYMMETRIZED, SHORT-PERIOD SI/GE SUPERLATTICES
AUTHOR: OLAJOS J (Reprint); ENGVALL J; GRIMMEISS H G; MENCZIGAR U; ABSTREITER G; KIBBEL H; KASPER E; PRESTING H
CORPORATE SOURCE: UNIV LUND, DEPT SOLID STATE PHYS, BOX 118, S-22100 LUND, SWEDEN (Reprint); TECH UNIV MUNICH, WALTER SCHOTTKY INST, W-8046 GARCHING, GERMANY; DAIMLER BENZ RES CTR, W-7900 ULM, GERMANY
COUNTRY OF AUTHOR: SWEDEN; GERMANY
SOURCE: PHYSICAL REVIEW B, (15 NOV 1992) Vol. 46, No. 19, pp. 12857-12860.
ISSN: 0163-1829.
PUBLISHER: AMERICAN PHYSICAL SOC, ONE PHYSICS ELLIPSE, COLLEGE PK, MD 20740-3844 USA.
DOCUMENT TYPE: Note; Journal
FILE SEGMENT: PHYS
LANGUAGE: English
REFERENCE COUNT: 33
ENTRY DATE: Entered STN: 1994
Last Updated on STN: 1994

ABSTRACT:
We report an identification and determination of the band-gap energies in a series of strain-symmetrized Si(n)/Ge(n) superlattices. Absorption onsets are observed that shift toward higher energies with decreasing period length in superlattices with identical Si/Ge ratio. Band-gap energies of 0.67, 0.76, and 0.88 eV for Si6/Ge6, Si5/Ge5, and Si4/Ge4 superlattices, respectively, are determined by a fitting procedure. Strong photoluminescence and electroluminescence are observed for the Si5/Ge5 superlattices. The energetic position indicates that the luminescence is related to interband transitions.

CATEGORY: PHYSICS, CONDENSED MATTER
SUPPL. TERM PLUS: SI-GE SUPERLATTICES; OPTICAL-TRANSITIONS; LAYER SUPERLATTICES; ELECTRONIC-STRUCTURE; SI1-XGEX ALLOYS; PHOTOLUMINESCENCE

REFERENCE(S):

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	ARN PG (RPG)	Referenced Work (RWK)
BASTARD, G	1988			WAVE MECHANICS APPLI
BRAUN, S	1973	44	2789	J APPL PHYS
BREY, L	1987	59	1022	PHYS REV LETT
CHURCHILL, A C	1991	6	18	SEMICOND SCI TECH <--
FROYEN, S	1987	36	4547	PHYS REV B
FROYEN, S	1988	37	6893	PHYS REV B
GELL, M A	1988	38	7535	PHYS REV B
GELL, M A	1991	5	449	SEMICONDUCT SCI TECH
GNUTZMANN, U	1974	3	9	APPL PHYS
GRIMMEISS, H G	1992	45	1236	PHYS REV B
HYBERTSEN, M S	1987	36	9683	PHYS REV B
HYBERTSEN, M S	1988	37	10195	PHYS REV B
JAGER, W				UNPUB
JAROS, M	1990	19	35	J ELECTRON MATER
LANG, D V	1985	47	1333	APPL PHYS LETT
MORRISON, I	1987	35	9693	PHYS REV B
NOEL, J P	1990	57	1037	APPL PHYS LETT

PANKOVE, J I	1971			OPTICAL PROCESSES SE
PEARSALL, T P	1987	58	729	PHYS REV LETT
PEARSALL, T P	1989	63	2104	PHYS REV LETT
PRESTING, H	1992	256	83	MRS C P
SCHMID, U	1990	41	5919	PHYS REV B
SCHMID, U	1991	43	14597	PHYS REV B
SCHMID, U	1990	65	1933	PHYS REV LETT
SCHMID, U	1990		865	20TH P INT C PHYS SE
SPITZER, J				UNPUB
TERASHIMA, K	1990	57	1925	APPL PHYS LETT
TURTON, R J	1990	7	37	MAT SCI ENG B-SOLID
TURTON, R J	1988	38	8397	PHYS REV B
VANDEWALLE, C G	1986	34	5621	PHYS REV B
WEBER, J	1990		1453	DEFECT CONTROL SEMIC
WONG, K B	1988	60	2221	PHYS REV LETT
ZACHAI, R	1990	64	1055	PHYS REV LETT